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Plate XVIII.

A MANUAL
OF THE
FIRST PRINCIPLES OF DRAWING,
WITH THE
RUDIMENTS OF PERSPECTIVE;
AND THE USE OF THE LEAD PENCIL.

Designed for the use of Elementary Studies.

BY C. H. WEIGALL,
PROFESSOR OF DRAWING IN THE CITY OF LONDON COLLEGE FOR LADIES.
AND
MEMBER OF THE NEW SOCIETY OF PAINTERS IN WATER COLORS.

London:
REEVES & SONS, 113, CHEAPSIDE.
1853.

170. m. 80.

PREFACE.

This little work is intended for the use of those persons who may wish to gain an insight into the first principles of drawing. It may be found useful also to those who may be engaged in teaching, and who, not having given much time to drawing as a separate study, may, nevertheless, find it necessary to include it in their course of general instruction. Many very useful works have been published by intelligent professors of the day, having the same aim as the present, but as there are many ways to the same end, the written experience of any person who has made any subject his particular study, and who has been long engaged in its tuition, cannot be wholly valueless. If no new views of the subject of the following pages are found in them, the method of explaining them may be found easy of adoption. In any case the author's hope is that he may be ranked with those of his brother professors, who strive to be useful in their vocation, by removing difficulties as they arise in the way of acquiring an useful and elegant art; and that this may be his excuse for offering his mite of experience in aid of the general stock.

13, *Michael's Place, Brompton,*
January, 1853.

MANUAL OF DRAWING.

THE Art of Drawing has been considered until recently, in relation to general education, merely as an accomplishment; and the pupil, unless he had extraordinary talent and liking for the pursuit, has seldom carried his efforts beyond the use of the pencil or chalk, applied in imitation of puerile copies placed before him: nor, had he felt disposed for further information, would he have received it from his instructor, who in most cases was incapable of carrying his pupil beyond the mere rudiments of art. In the present day, this branch of study is receiving a larger share of attention; its influence in general education is felt and acknowledged; and the talent of the pupil has a fair chance of full development, for its teachers are found in the ranks of its highest professors.

The art of drawing gives refinement to the most ordinary pursuit; and independently of the many sources of gratification the study of it opens to the mind, it assists, by its diagrams, in every other channel of instruction.

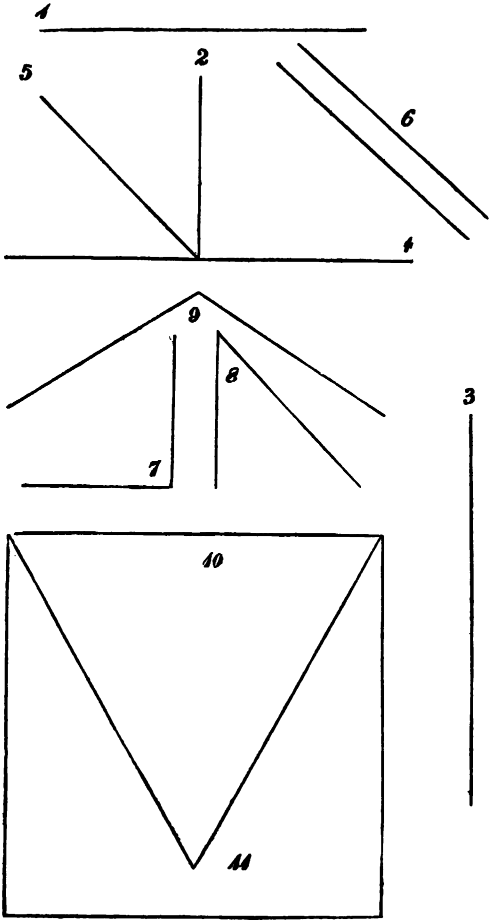
Drawing is an imitative art, and the power of imitation is possessed by all in a greater or less degree; but it must be allowed, that all of sufficient intellect to receive instruction in any other branch of education, may acquire a knowledge of this art, by giving to its stúdy an equal share of attention. In support of this position, I would observe that writing is nothing but drawing; each letter of the alphabet has a form peculiar to itself, by which it is conventionally known; and we are all aware at how early a period of life a child becomes acquainted with these forms in all their varieties, and is enabled to write or draw them from memory. In the earliest known form of writing, letters and whole sentences were expressed by animals and other familiar objects; and if in our day the signs of our ideas were expressed in the same manner, the forms of such objects would be retained in the memory, and drawn upon paper, as easily as the forms of the letters of the alphabet, which have no connexion in the mind with any other object with which it is familiar.

Drawing enables us to give a representation of objects in their several properties of form, light and shade, colour, and perspective appearance. We commence, therefore, from the beginning.

Form as expressed by Lines.

A line is defined to be that which has neither breadth nor thickness, but length only; and the extremities of a line are points.

Plate I.



When a line lies evenly between its extreme points, it is called a *straight* line (Plate I., fig. 1); when it does not, it is called a *curved* line or *curve.*

These two kinds of lines form the alphabet of the art; and from their modification, all the forms of which we have any notion are represented. The first thing, therefore, the pupil has to understand, is to make these lines, and then to apply them in the delineation of the objects to be represented by them.

STRAIGHT LINES.

I. An angle is the inclination of two straight lines, which meet together at a point (Pl. I., figs. 7, 8, 9).

II. When a straight line falling on another straight line makes the angles on each side equal, each of the angles is called a right angle, and each of the lines is said to be perpendicular to the other (Pl. I., figs. 2, 7).

All right angles are equal; and the ninetieth part of a right angle is called a degree. A right angle, then, is an angle of 90 degrees (or 90°).

III. An angle less than a right angle, or than 90°, is called an acute angle (Pl. I., fig. 8); and an angle greater than a right angle, or than 90°, is called an obtuse angle (Pl. I., fig. 9).

IV. A triangle is a three-sided figure; and if the three sides are equal, it is called an equilateral triangle (Pl. I., fig. 10). The angles of a triangle are equal to 180°; and each of the angles of an equilateral triangle is one of 60°.

V. A square is a four-sided figure with all its angles right angles, and all its sides equal (Pl. I., fig. 11).

VI. An oblong is a four-sided figure, with all its angles right angles., but with all its sides not equal (Pl. II., fig. 13).

VII. A diagonal line of a four-sided figure is a line joining two of the opposite angles (Pl. I., fig. 5).

VIII. A cube is a solid figure, having six faces equal to one another, which are all squares (Pl. II., fig. 12).

IX. Parallel lines are lines going in the same direction, and which, being continued either way ever so far, never meet (Pl. I., fig. 6).

X. A vertical line is a line parallel to the plumb line (Pl. I., fig. 3); and a horizontal line is a line perpendicular to the plumb line (Pl. I., fig. 4). Since the base line of a picture is always supposed to be a horizontal line, every line going across the picture parallel to the base is a horizontal line.

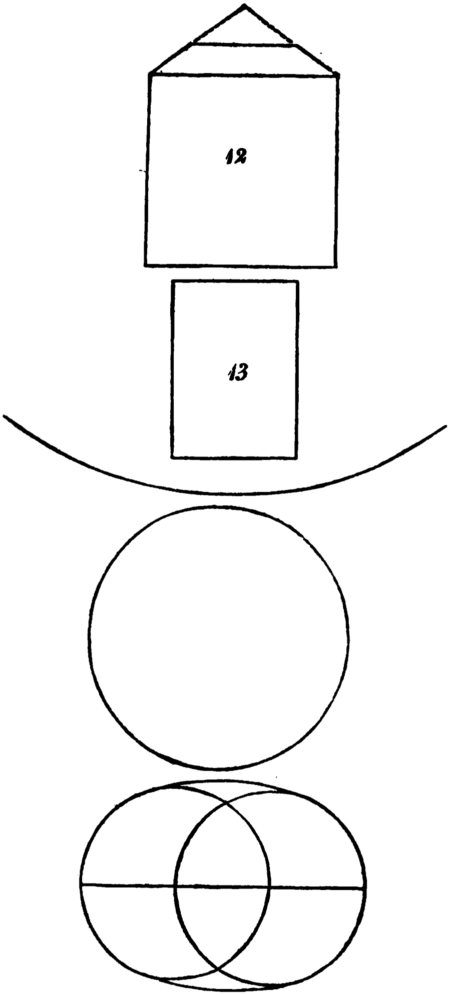
Curved Lines.

Of curved lines are formed circles and ovals (Pl. II).

I. A circle is a figure enclosed by one curved line, called the circumference, such that all straight lines drawn from a point inside, called the centre, to the circumference are equal.

II. These straight lines are called radii; and any straight line drawn through the centre, and dividing the circle into two equal parts, is called a diameter.

Plate II.



III. An oval is a figure of elongated shape, enclosed by one curved line, which is not circular.

DRAWING FROM GEOMETRICAL FIGURES.

Drawing from geometrical figures has been lately much insisted on in school drawing-classes. It is no doubt to a certain extent useful; but I am not prepared to admit its utility to the extent demanded for it; and I think it always better that the pupil should commence with surface drawing, because the attention is more easily directed to an object proposed for imitation, to which the copy will bear a resemblance in material, and because this mode of imitation leads the mind by a more simple process to compare the resemblance with the realities of form. The impression made on the mind by any object through the medium of the eye is the same in all. The child has as perfect a knowledge of the difference between persons and between things, as the professor who is engaged in directing his study. The picture is as complete in his mind; but to express this on paper it is required that the hand should be trained to sympathise with the mind.

In copying from a drawing, the pupil has the same instrument and material to work with, as that with which the model placed before him has been performed, and the attention is not too much strained. Copying from a solid form involves a double process. The picture has first to be received on the mind, and the impression made thereon produced on the paper, by an instrument to which he is unused. It is no doubt adviseable to lead the pupil to the model at as early a period of his study as possible: such has been the practice of every respectable professor; and geometrical figures, as they contain the roots of most forms, are well adapted for the purpose; and they offer facilities for early lessons in perspective. But to take up the time of the pupil, frequently for the whole period of his education at school, upon these simple elements of form, is robbing him of that time in which the memory is most active, and most capable of receiving the brightest impressions from all the varieties of projection and colour that will come under his notice in future practice. I therefore do not think it a satisfactory conclusion, that to draw a cube, a circle, or other geometrical figure, is the grand step gained on the high road of art. It may be adapted for carpenters, masons, or other mechanical arts: the artist gathers this knowledge on his way. A pupil trained in this method may draw a work-box or tea-chest, an egg or basin, but would find he had his study to recommence when the objects that art has more generally to do with—as the human figure, animals, the characteristics of country, trees, buildings, or plants, in all their variety of form, colour, and perspective appearance—came under his notice for representation. In fact, to confine the young mind to the study of geometrical figures, is to cast fetters on the imagination, from which it has a difficulty in emancipating itself.

The capability of drawing depends on the facility with which the hand can convey on the paper the images impressed on the memory by the eye; and it must be necessary that the mind should be stored with numerous and varied forms, instead of being confined to those forms alone produced by rule and compass. I deem it, therefore, quite sufficient to explain the elements of form upon these models, and their perspective changes; and then to lead the pupil to the objects to which these forms have reference.

All studies should, as far as may be practicable, present themselves in an agreeable form to the youthful mind. In reading, the child's first lesson is the alphabet; the next, the combination of these letters into syllables; and who does not recollect the delight with which the young mind recognises in them the familiar notions of its every day experience? But if it were insisted that these words should only have reference to the principle of combining letters into syllables, so that C A S or D O D should be given to him to learn, instead of C A T or D O G, the child's efforts would be uninteresting to him, and his progress slow in proportion. By the first, he would gain no idea beyond the simple construction of a syllable; by the latter, he would become acquainted with a word, fixed in his memory by its connexion with an object familiar to him. So in model drawing: as soon as the pupil can draw a cube, the objects to which it refers—as chairs, tables, stools, buildings, or any other right angled object, being a form in use—should be placed before him; and in the same way, when he has become familiar with the curved line and circles, the various objects formed by them, and their perspective changes, should be explained upon them.

Perspective.

It is not necessary, in a rudimental work like the present, to analyse the process by which the mind intuitively arrives at the knowledge of any form that may be presented to the eye. It will be sufficient to observe, that the apparent changes found in the direction of the lines of an object in the different positions in which it may be viewed, do not embarrass the spectator; and that he would be enabled at once to pronounce on the form of a square box, or circular form, either placed opposite to, or (as we may term it), square to, the eye, or viewed obliquely; but there would be a difficulty experienced, when he came to produce an imitation of such an object on a flat surface, in finding the receding portions of the object to present an appearance differing from what he knows to be their real form; and we have seen the curious blunders made in this respect by Chinese and Indian artists. It is the province of perspective to explain how these changes are effected.

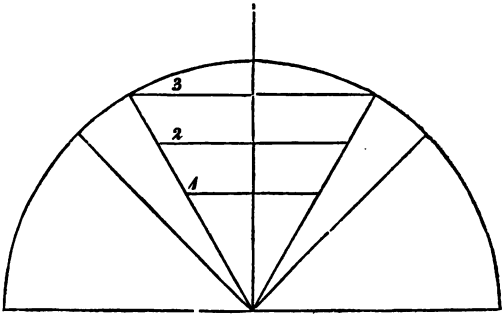
Perspective is of two kinds,—linear and aërial. By linear perspective, we give by lines the proportional diminution of objects receding from the eye. Aërial perspective carries out the principle, by giving, in addition, the differences produced by atmosphere. A knowledge of perspective enables us to represent objects as they appear to the eye, and explains to us the difference between their apparent, and what we know to be their real form. To satisfy the mind that objects diminish as they recede from the eye, both in form and intensity, we have but to look through the window of the room in which we are sitting, and in one of the panes of glass we shall be enabled to take in the whole of our opposite neighbour's house; and if we were so placed that our view were uninterrupted down a long street, for example, we should find that the tops and bottoms of the houses would appear to approach each other, and to meet at a point on a level with our eye; and that the colour of the houses, as they receded from the eye would become less vivid, until the most distant would appear, if it were a hazy day, of the same colour as the atmosphere. Another familiar example is afforded us by railway tunnels, where the road is perfectly level, and the spectator looking through it, if the length were considerable, would find the opening at the further end appear as a mere speck of light, although he would know it to be as large as the opening at the end from which he was looking: he would also observe that the lines of rail would appear to approach each other as they receded from the eye, and to converge in a point, and that the lines of masonry at the top and sides would appear to converge to the same point. This point is called in perspective the point of sight, and its situation would be on a line level with the eye of the spectator. This line is called the horizontal line. If a person were standing on the sea-shore, or were to be looking over a large extent of unenclosed country, where nothing would intervene between his eye and the extreme distance, the line that would in the first case mark the boundaries of sea and sky, and in the second, the boundaries of earth and sky, would be the horizontal line; and the point of sight is a point upon this line, which may be described as representing the eye of the spectator, being always opposite to where he stands, or as it is termed in perspective, the station.

PLATE III.

VISUAL RAYS.

We see any object by reason of the light that shines on it, and this light is given out from the object in an infinitesimal number of rays, proceeding from it in every direction. These are termed visual rays. Experience shows us that only a certain number of these rays can find their way to the eye at the same time. The laws of perspective fix this number at that which would be contained within an angle of 60 degrees. It is found that to see distinctly all the objects that come within any given space,—that is, for the eye to take in all the

Plate III.



boundaries of the picture at the same time,—we must be at least at the distance of its full length and breadth from it. If the pupil holds his pencil before his eye, but close to it, he will only be enabled to see so much of it as the length of the space between his eye and the object; but if he remove it by degrees, until it is distant its full length from the eye, he will then be enabled to see the whole of it. This distance is found to be the least from which the visual rays that proceed from the boundaries of the object or scene reach the eye, and they form with it an angle of 60 degrees, of which the eye or point of sight is the apex.

The opposite diagram will be found very useful to the student in perspective, and it should be thoroughly understood in the commencement of the study. In drawing from nature it is agreed that the eye of the person sketching is placed in the centre of a circle of 360 degrees; but the eye while it is stationary cannot take in more of the view than will be comprised within an angle of 60 degrees, or 30 degrees on each side of the central ray; so that if a person were placed on an eminence, from which a panoramic view of the country could be obtained, he would have to change his position or direction of view six times before he could obtain the whole of the landscape. As this has been (as I believe) tested by the camera lucida, and is agreed upon, this diagram is formed upon it. Let us, then, construct a semicircle, or the figure which is comprehended between the diameter of a circle and half its circumference. This will be found to contain 180 degrees. A perpendicular line drawn through the centre will divide this into two equal parts of 90 degrees each; and if two radii are drawn, one on each side of this perpendicular line, at 30 degrees from it, they will form together an angle of 60 degrees, which will be the expanse of vision. These lines may be extended at pleasure, according to the extent of the object or view to be represented. The lines marked 1, 2, 3, on the expanse of the angle of 60 degrees, are the base lines of pictures; the size of the object, or the extent of the view, depending upon the distance at which we are placed from it. The lines forming this angle of 60 degrees represent the boundary visual rays, and make with the base line of the picture an equilateral triangle, with the station or place of the spectator for the apex.

PLATE IV.

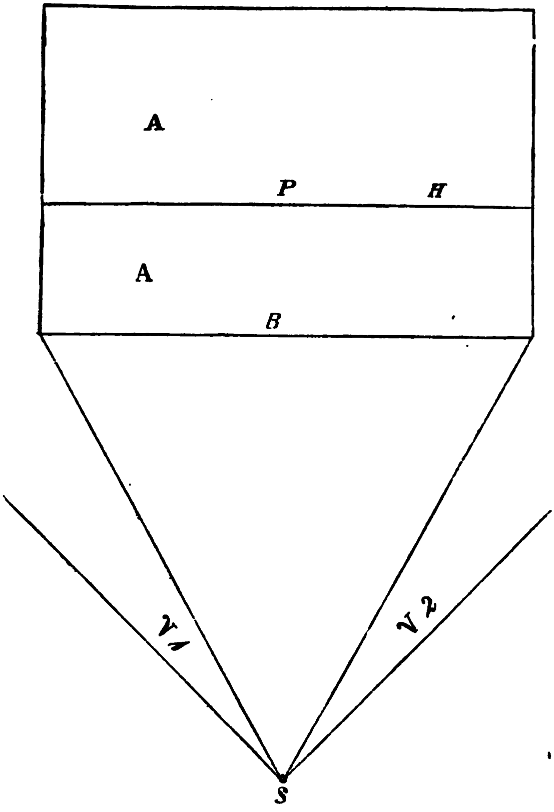
STATION.

It is to be remembered then, that if we desire to take in on our picture, or plane of delineation, the whole of any scene or object, the station of the spectator, or distance from which such scene is to be viewed, will form an equilateral triangle with the base line of the representation, being the nearest point from which the visual rays proceeding from its boundaries reach the eye at an angle of 60 degrees.

POINT OF SIGHT.—VANISHING POINTS.

The eye being in the centre of the picture, its place

Plate IV.



A, Picture or Plan of Delineation.	P, Point of sight.
B, Base line.	S, Station.
H, Horizontal line.	V 1, V 2, Vanishing lines.

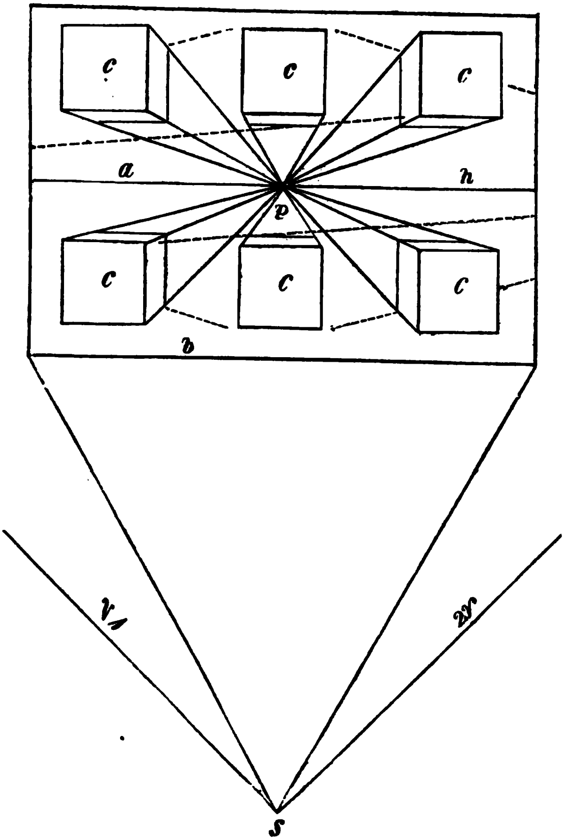
is found at a point on the horizon opposite to the station or place of the spectator. This point is understood to be the point of sight, and it is the point of convergence for the receding lines of all objects whose base lines are parallel to the base line of the picture. When the base line of any object is not parallel with the base line of the picture, its receding lines will require other points on the horizontal line to which they vanish; and these are found to be those which, with the station, will make an angle of 90 degrees, and are called vanishing points, or points of distance; so that if an object be placed square to the eye, or with its base line parallel to the base line of the picture, its receding lines will be found to converge to, or vanish in, the point of sight, which point must be in the picture or plane of delineation, coming within the visual angle of 60 degrees; and if the object be placed at an angle with the base line of the picture, its receding lines will converge to or vanish in other points on the horizontal line, called vanishing points, or points of distance, which require to be found out of the picture. These vanishing points will be found by placing the corner of a card, or any other profiled right angle, at the station; and the points where the lines formed by the angles intersect the horizontal lines, will be the vanishing points. The angle of the object may be turned in any degree not parallel to the base line, and the receding line of one of its sides being drawn to the horizontal line, the profiled right angle, placed in the same direction from the station, will give the vanishing point for the opposite side at the proper angle of 90 degrees. It will be understood, therefore, that as one of the receding angles of the figure becomes acute, the other receding angle becomes obtuse; and that, although one of the vanishing points may thus come in the plane of delineation, the other will be proportionally extended beyond it; the plane of delineation, or picture, being comprised within, the angle of 60 degrees; and the vanishing points forming the angle of 90 degrees, they cannot both be in the picture at the same time.

PLATE V.

We have before defined the horizontal line to be a line level with the eye of the spectator, and the point of sight, as received to be a point on that line, opposite to the station or place of the spectator, from whence the scene, or subject to be represented, is viewed, and that the receding lines of all objects vanish somewhere on this line; that if the objects have their base lines parallel to the base line of the picture, their receding lines will find their vanishing point on the point of sight; and that if their base lines be not parallel to the base line of the picture, the receding lines will find their vanishing points on the horizontal line, at such distance from each other as will be comprised in the angle of 90 degrees.

This diagram,—a cube or solid square,—as seen in its perspective changes, will furnish an example upon the foregoing instruction. The picture, or plane of

Plate V.



delineation, may be of any form at pleasure. About one and a half in width to one in height will present an agreeable form for most subjects. The base line being marked, and the station or place of the spectator being found at an equilateral triangle with the base line, proceed to mark the horizontal line, which in this diagram is given half way up the picture, and the point of sight in the centre of the picture, perpendicularly opposite to the station, as being a direct and simple application of the rules given. It will be recollected that the horizontal line may be placed at any height on the picture, according to the nature of the subject; observing, that if it be placed too high up, it leaves too little space for the sky, and if placed too low, the picture may lose interest for want of sufficient foreground; but, as before observed, it will be regulated by the taste of the artist, and the requirement of the subject to be represented. About one-third up the picture seems to be that proportion most agreeable to the eye. The point of sight also is generally placed either to the right or left, to avoid an appearance of formality; and in doing so, the station must be moved in accordance with it, as will be hereafter explained.

A is the picture, or plane of delineation.

B is the base line.

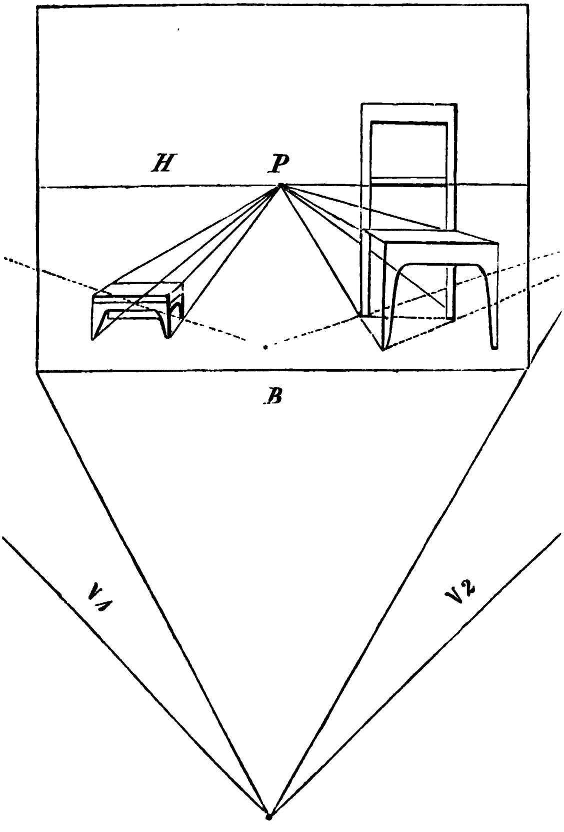
C is the cube in different positions with regard to the spectator,—to the right, the left, above and below the eye, or point of sight. The base lines of these differently placed cubes being all parallel to the base line of the plane upon which they are represented, the receding lines of their sides will have a common point of convergence in the picture, as they come within the expanse of vision, or angle of 60 degrees. This point is the point of sight, marked P, the centre of the picture, on the horizontal line, marked H, and opposite to the station, marked S. In the cubes immediately square to the eye, the one above and the other below the eye, only two of the sides can be seen at once. In the others, situated to the right and left, three of the sides will be seen. The sides parallel to the base line do not alter their geometrical form; but lines or visual rays drawn from their angles so as to centre in the point of sight, will show the receding character of those sides that are not square to the eye.

We now require the vanishing points to determine their proportional diminution. Place the profiled right angle at the station, and draw two lines from it until they intersect the horizontal line at V 1 and V 2; then set off the width of the cube horizontally from the base line, and a line drawn from this point to the vanishing point, through the visual rays, will give the diminution at their points of intersection.

PLATE VI.

Supposing the foregoing diagram to be thoroughly understood, we will now proceed to carry out the principle advanced in the former part of this work; and having received the first instruction in perspective

Plate VI.



on a simple geometrical form, go on to its practice on those forms to which it refers. In this diagram—a chair and a stool—it will be seen at once that if the sides and bottom were to be removed, leaving nothing but the angles for the legs and the upper side for the seat of the chair, by pursuing the plan laid down in the previous diagram, we should obtain a correct representation of the figure. First mark the base line of the plane of delineation, B; then place your horizontal line, H, and find the station, S, by the equilateral triangle formed with the base line; next fix your point of sight, P, on the horizontal line, opposite to the station; then place your profiled right angle at the station to find the vanishing points, V 1 and V 2, at their points of intersection with the horizontal line. Now take the size of the cube which is to be the foundation of the chair, and mark the side square to the eye by points on the paper; then draw the visual rays from the angles to the point of sight for the diminution of the receding sides. Now, as the chair is seen in front, parallel with the base line, and is of a square form, being as high as it is wide, let the width be set off horizontally in front, from the leg on the left side, as in this aspect we see that receding side, and from this point carry a line to the V 2, and we shall have the diminution of the side of the chair at the point where the diagonal line intersects the visual ray drawn from the front leg of the chair,—a line parallel with the base being drawn from this point to where it intersects the visual ray drawn from the other leg will give the place for the distant leg on that side. This figure may be repeated by shifting the chair to the right or left of the point of sight until the diagram is thoroughly understood. The stool being drawn on the same principle, it will not be necessary to give the lines, the same being common to both figures. The ground plan of the stool being a square, the legs are equidistant from each other, and the place for the distant legs is found by the vanishing line, as shown in the legs of the chair.

PLATE VII.

To put a Room in Perspective.

A square room, it will be seen, is easily referred to a hollow cube, or oblong. Mark the horizontal line and point of sight as before. Draw visual rays from the top and bottom of the sides nearest to you, to the point of sight. Draw a line parallel with the base line, from one ray to the other, and you will have the floor of the room. From the point of junction erect perpendiculars to meet the visual rays from the top of the room, and where these lines meet, a line drawn parallel with the base line, will give the place for the ceiling. The room will appear larger or smaller as the lines determining the ceiling and floor are near or distant. If it is desired to represent a boarded floor, mark the width of the boards in regular spaces on the base line, and visual rays drawn from them to the point of sight will give their true perspective appearance.

Plate VII.

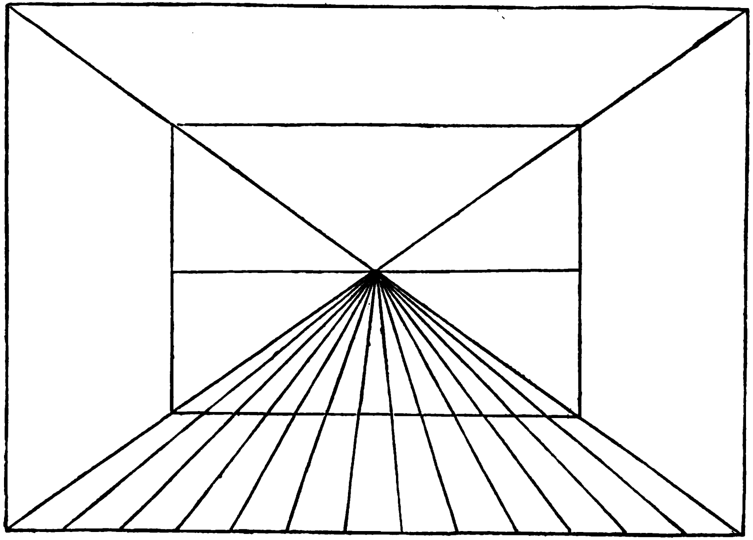


Plate VIII.

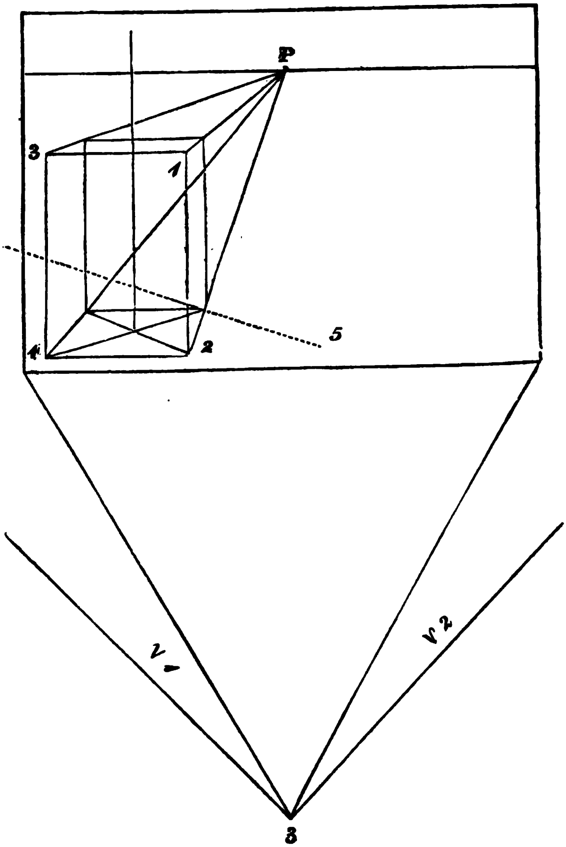


PLATE VIII.

TO FIND THE CENTRE OF A PEDESTAL ON WHICH TO ERECT A COLUMN OR FIGURE.

Mark the base line of the picture. Proceed to find the station by the equilateral triangle formed with the base line. Next mark your horizontal line and your point of sight, and place your profiled right angle for the vanishing points, and mark their places on the horizontal line at v 1 and v 2. The student, having determined the size of the pedestal, will draw the side square to the eye, and from the corner nearest to him draw the visual rays, 1, from the top, and 2 from the bottom; so from the opposite corners, as at 3 and 4. Next set off from the base line square to the eye the width of that side, as at 5, and a line drawn from thence to the vanishing point will give the size of the side receding from the eye, at the point of intersection with the visual ray 2; a line drawn from this to the visual ray 4, will give the ground plan, and perpendiculars drawn to meet the visual rays at 1 and 3, will give the top of the pedestal. Next draw diagonal lines from the angles of the ground plan of the pedestal, and at their point of intersection raise a perpendicular line through the top, and you have the perspective centre of the pedestal upon which to place the object proposed.

PLATE IX.

TO FIND THE GABLE END OF A COTTAGE.

Proceed as before to mark the base line, to find the station, the horizontal line, the point of sight, and the vanishing points. Draw the side of the cottage parallel to the base line of the picture, and draw visual rays from the angles to the point of sight. Set off horizontally the geometrical width of the side receding from the eye, and draw a line to the vanishing point; and at the point of intersection with the visual ray will be found the perspective width of that side. Erect a perpendicular line at this point, to meet the visual ray from the top, and the walls are complete on which to raise the roof of the building. A diagonal line drawn from the angles of the gable end, will find the centre; from which erect a perpendicular line, the height required for the roof; and lines drawn from the upper angles to meet this, will complete the gable end. We now require a vanishing point for the roof. For this purpose, a line must be drawn through the point of sight, perpendicular to the horizon; and the line marked, being continued until it meets this, will find the vanishing point for the roof. The rows of tiles, also, will converge to the same point, and the building is now complete.

PLATE X.

A PYRAMID.

Find the square, A B C D, for the base of the pyramid, as before described, for the diagrams of the cube and the pedestal. Find its centre, also, by the diagonal lines from the angles, and from the centre erect a perpendicular line, the height required for the pyramid. Lines are then to be drawn from all the angles to meet this, and the pyramid will be complete.

Plate IX.

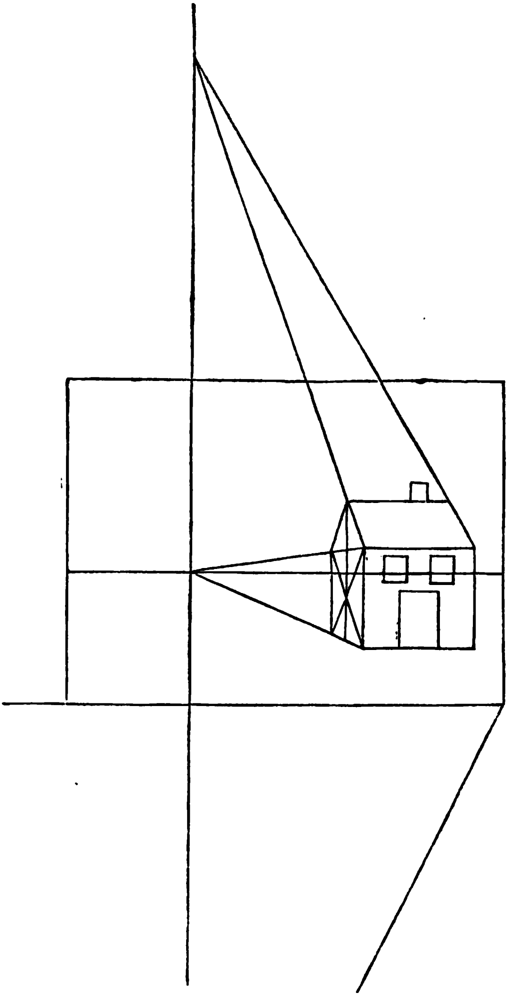


Plate X.

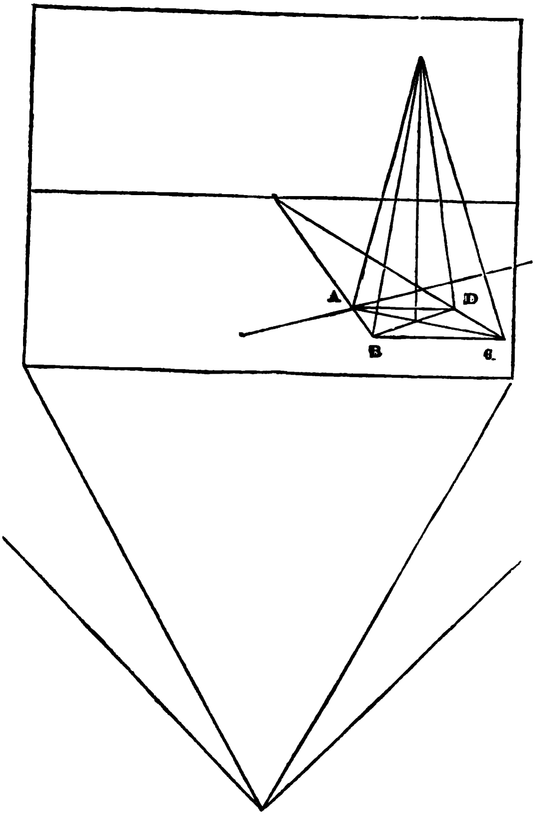


Plate **XI.**

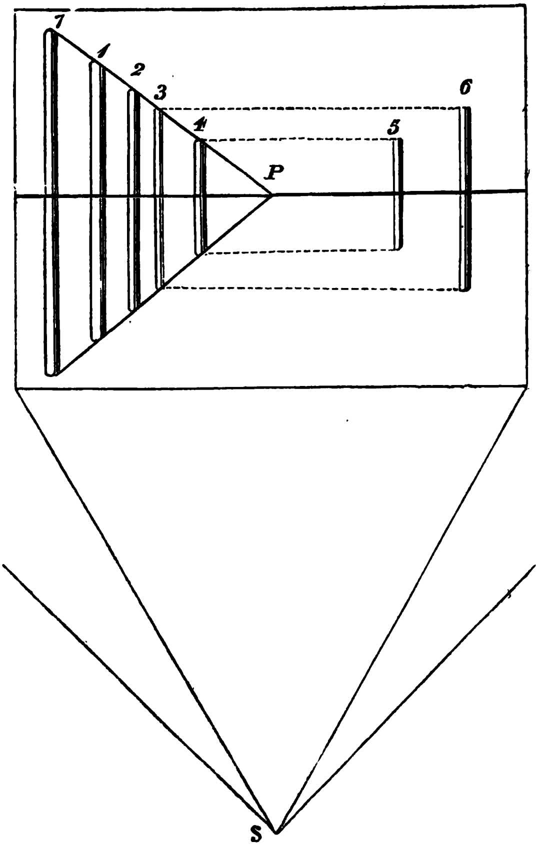


PLATE XI.

TO FIND THE PROPORTIONAL HEIGHT OF POSTS AT DIFFERENT DISTANCES IN THE PICTURE.

Having determined the height of one, as at No. 1, draw visual rays from the top and the bottom of it to the point of sight; and the perpendicular drawn anywhere between these bounding rays, will mark the height of a similar post at that distance from the horizon as at 2, 3, 4. Now, to find the height of a similar post, situate anywhere on the plane of delineation, we have but to carry a line from its base parallel to the horizon, until it meets the visual rays drawn from the first post, and the height there given will be the correct one; see figures 5 and 6. So that, as objects diminish or increase in size as they approach to, or recede from, the horizon, we have but to ascertain the height of any one of them, and carry visual rays from the top and bottom to the point of sight, and the diminished height of any similar object is found between it and the horizon, and by extending the rays at the same angle to the front of the picture, the size of the object, increasing as it approaches the spectator, will be easily obtained. Thus, the rays being first drawn to find the height of the posts between No. 1 and the horizon, and the height of a post being required at 7, continue the lines from 1 at the same angle to the edge of the picture; and having determined the place of No. 7, by carrying the line parallel to the horizon from this place to the visual rays, we shall find the increased height, as in the others.

To find the proportional height of figures or animals on the same plane, is ascertained in the same manner as in the preceding diagram. Mark from the figure nearest to you, visual rays from the head and feet to the point of sight; and if the height of a similar figure is required on any part of the plane of delineation, we have but to carry a line parallel to the horizon to meet the visual rays drawn from the first figure, and the height of the figure found at that point of intersection will be the height required.

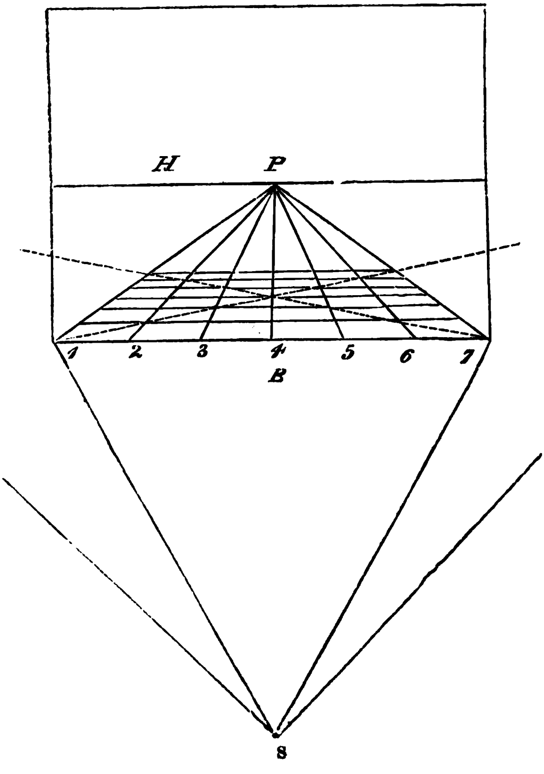
If the height of a figure placed on an eminence is required, in order to be very exact, the ground plan of such eminence should be first found (as in the pedestal on which to place the column, plate 8); and from the centre, draw the line parallel to the horizon, to where it intersects the visual rays, and transfer the height of the figure there given to the elevation, which will be its proper proportion, as figures do not increase in size by being raised.

PLATE XII.

To put a Square Pavement in Perspective.

Mark your base line B; the horizontal line H; and find the station, S, by the equilateral triangle, as before. Next, the point of sight, P, and the vanishing points, by the profiled right angle placed at the station. Mark on the base line any number of equal spaces, according to the number of the squares intended in

Plate XII.



the pavement, as 1 2 3 4 5 6 7. Draw visual rays from them to the point of sight. Next draw diagonal lines from the nearest angles; and from their points of intersection with the boundary rays at 1 and 9, draw a line parallel to the base line, and the square will be ascertained; and parallels drawn through all the points of intersection, will find the squares in their proper order of diminution. A chess-board may be drawn in the same way.

We have before stated that the eye when stationary takes in an expanse of 60 degrees; that is to say, 30 degrees on each side of the central ray. Therefore, although according to the taste of the artist, or the requirement of the subject, the point of sight may be placed anywhere on the horizontal line, *it is always understood to be the centre of the picture*, governing the equilateral triangle and the vanishing points; so that, wherever it may be placed on the horizontal line, a line drawn down perpendicularly from it, will find the station at that distance from the base line which will form an equilateral triangle with it, taking the measurement of the base line equally on each side of the perpendicular line. It is, therefore, to be understood, that the point of sight will be the centre of the subject or scene viewed; and that if it be placed to the right or left of the picture, or plane of delineation, the taste of the artist has curtailed his picture on that side, to suit the artistic arrangement of his subject. But as the laws of perspective are not dependent upon taste, the vanishing points, governing the perspective appearance of objects according to the angle under which they are viewed, must be found by the rules already given.

PLATE XIII.

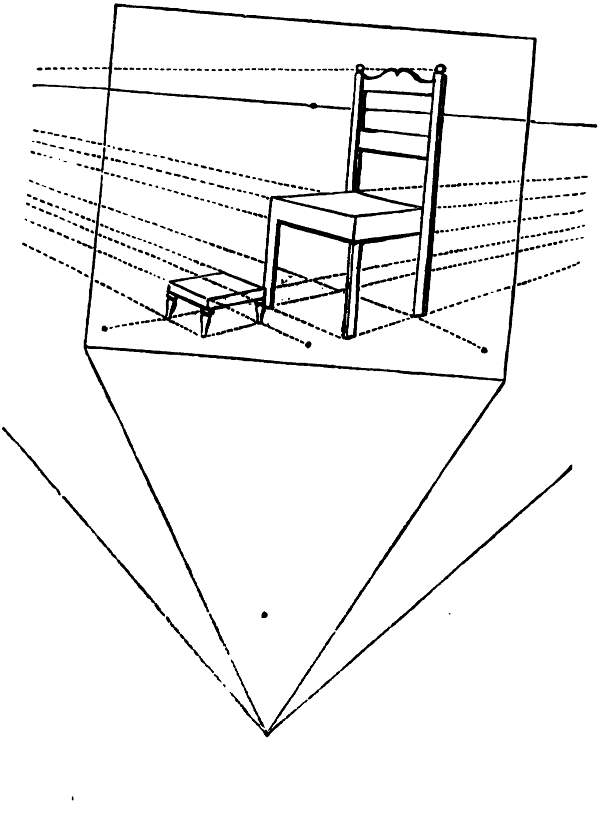
OBJECTS IN OBLIQUE OR DIAGONAL PERSPECTIVE.

It has been before mentioned, that so long as any right-angled object is placed immediately opposite, or, as it is termed, square to the eye, its base line being parallel to the base line of the picture, the receding lines of its sides converge to, or vanish in, the point of sight; and this is termed parallel perspective. But when the position of the object is such that its base is not parallel to that of the picture, the receding lines will converge at points formed by an angle of 90 degrees, such angle being taken at the station as the apex, according to the rules already given, and its sides terminating on the horizontal line; and this is termed oblique perspective. If the object be so placed, that one side recedes more abruptly from the eye than the other, so as to come nearer to, or even within, the picture, the other vanishing point extends in proportion further out of the picture; so that the angle of 90 degrees will still be preserved between the two points: one of the vanishing points, or points of distance, may therefore come within the picture or angle of 60 degrees, but they cannot both be in the picture at the same time.

A CHAIR AND STOOL IN DIAGONAL PERSPECTIVE.

The point of sight is not required in this diagram;

Plate XIII.



except to find the station at which to place the profiled right angle for the vanishing points.

A few hints on copying drawings and on sketching from nature, may be found useful before we conclude this work. It is sometimes recommended to the pupil to prepare a frame-work of Bristol board, or other stout material, dividing and pointing it all round in equal spaces, say half an inch; and with a needle, passing thread through the points, the space would be covered with half-inch square divisions. When a drawing has to be copied, whatever size it may be required, it will only be necessary in the first instance to determine the proportion the copy is to bear to the original, either larger or smaller, and make corresponding marks on it. Thus, if the copy is to be half the size of the original, your prepared board being squared in half inches, the original should be squared to a scale of one inch; so that by observing what portion of the work comes into any of the squares, and marking the same portion in the corresponding squares of the copy, accuracy is ensured. Thus, by enlarging or reducing the size of the squares, the drawing may be increased or diminished at pleasure. This is a plan in use by engravers, for making reduced working drawings, and answers extremely well for that purpose. The objection to its use by the student is, that it leads him to depend too much on rule and compass, and too little on the eye. For general purposes, it will be sufficient to draw two lines at right angles through the original, and two others from the corners diagonally, and the same in the copy. The situation of the parts of the work will be thus sufficiently ascertained for all useful purposes, and something left for the education of the eye.

In sketching from nature it will be found a very useful and simple plan to have two pieces of card or Bristol board; one cut to an angle of 60 degrees, and another into an angle of 90 degrees. These profiled angles will be found to answer to those given in the first diagram, page . The use of these two angular models will be easily seen by referring to the rules given in this work. If the angle of 60 degrees be held with its apex horizontally under the eye of the sketcher, the apex will represent the station, and the eye, being carried along the sides, will show how much of the view will come within the wings of the angle, answering to the expanse of vision, which, as we have before stated, is comprised within an angle of 60 degrees.

In the same way, the angle of 90 degrees serves to show the vanishing points or points of distance, the sketcher holding it before him as in the former case, and carrying the eye along the sides until it meets the horizontal line; the points of intersection will then give the distances required. Having, therefore, ascertained the direction of any one of the receding lines of the object to be delineated, and placing the profiled right angle in accordance with it, and carrying the eye along the line until it meets the horizon, the other retiring side will be found according to rule.

PLATES XIV AND XV.

In these Plates a subject is given in illustration of parallel perspective. The vanishing points for all the receding lines of the building, and which is also in this case the point of sight, is placed at the doorway of the little distant church. The tomb in front, having its upper line or top in the same line with the horizon, has its receding side level with the parallel line constituting the top of the nearer side; thus the two sides form but one straight line.

In the outlines given with these drawings the lines are drawn to the respective vanishing points, to show more clearly the application of the rule.

PLATES XVI AND XVII.

In these Plates a similar subject is given in angular or oblique perspective. In this building the receding lines on both faces converge to separate vanishing points, out of the picture, to the right and the left hand, the space between which two points will be found to be ninety degrees.

PLATE XVIII.

In this Plate is given an illustration of that style of subject but adapted to a horizon placed high in the picture. (See Frontispiece.)

PLATE XIX,

Illustrates the character of landscape best suited to a low horizon, though in both cases this is but matter of taste with the artist, as no fixed rule for such exists.

Plate XIV

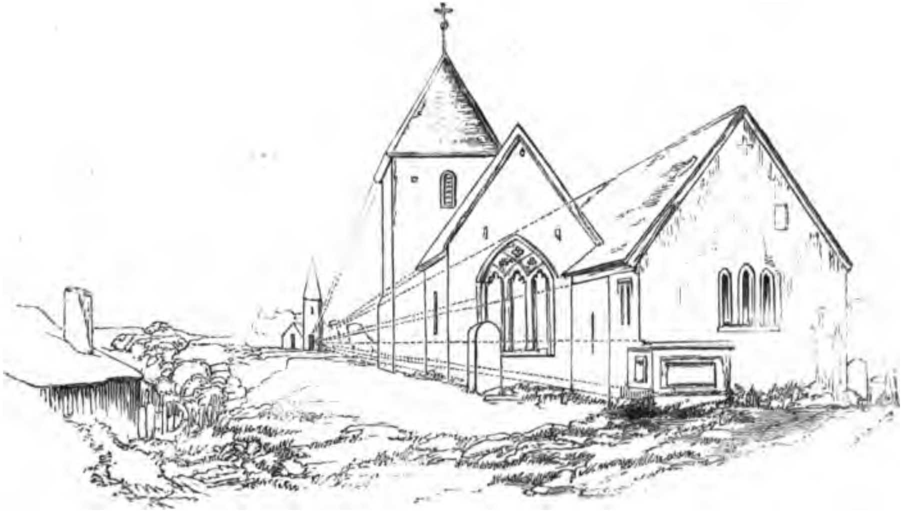


Plate XV.

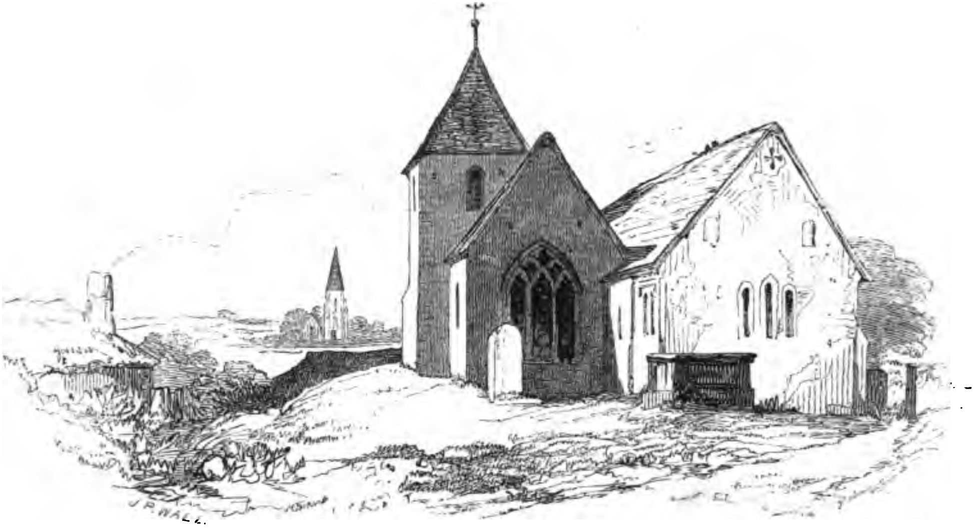


Plate XVI.

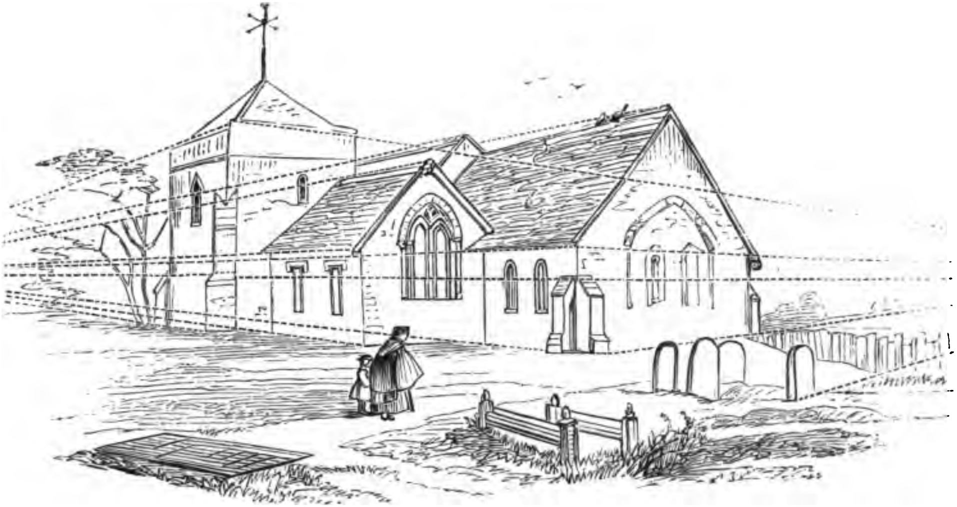


Plate XVII.

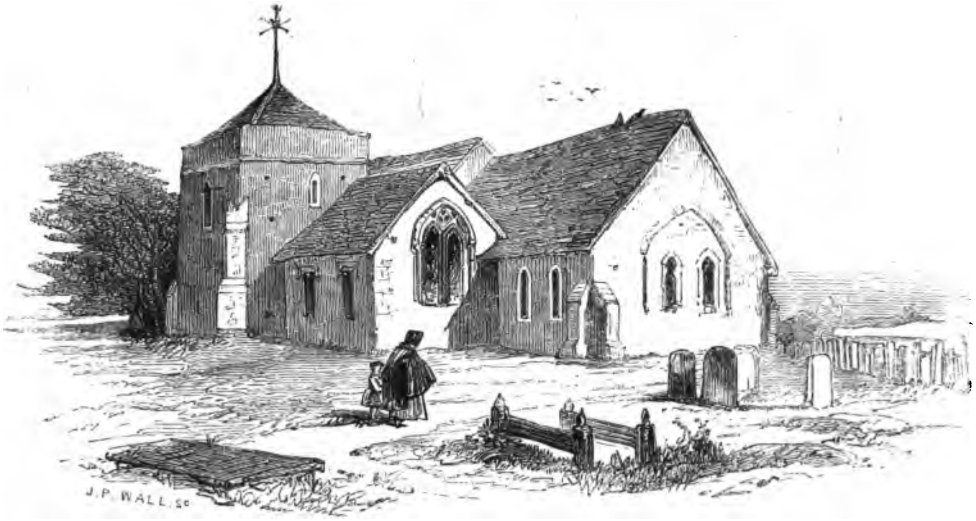
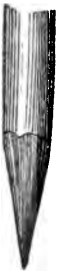


Plate XIX.

On the Use of the Lead Pencil.

OUR first efforts in drawing are made through the aid of the lead pencil,—a very simple instrument, but much may be expressed through its means. It is now brought to such perfection, that we are not as formerly obliged to resort to chalk, whenever great freedom or power may be required. It is made of various degrees of hardness and tone; and besides the freedom with which it obeys the hand, its cleanliness in use is an advantage that tells much in its favour. The pencil should be made of the best Cumberland lead, free from grit, and the best pencils are found in the end to be the cheapest. The shops are filled with low-priced foreign pencils, that certainly endure for a long time, but are either of so hard a quality that they almost cut through the paper when a firm or expressive touch may be required, or of so soft a character that the lines made by them are scattered in dust over the paper, thus preventing the possibility of preserving it for a clean finish.

The best pencils are obtained at the artists' colour shops, prepared in intermediate qualities of hardness and blackness, to suit the various requirements of the artist, either adapted to the finest outline drawing and the delicacy of extreme distance, or to the bold and vigorous character of a rocky foreground, and the blackness of intense shadow. The pencil marked H B is, perhaps, the best to use in the commencement, as, while it obeys the hand freely, it is capable of producing a clear and fine outline, and giving all necessary expression to it. It is also desirable to pay some degree of attention to the pointing of it. The pencil should be cut with care to have a long shoulder, turning it in the hand while cutting it, and removing the wood in a regular slope from the shoulder to the point, leaving but a small portion of the lead exposed, so as to appear thus:



The ordinary method of cutting the pencil is to get rid of the wood by any means; cutting deeply into it in many places, and leaving the lead unequally supported; consequently, when a line is required to be rather more firmly expressed, the lead gives way, and half the pupil's time, to say nothing of the waste of the material, is taken up in re-pointing the pencil. In the broad and softer pencils, used for shading, it will be found useful to cut the lead of a flat or chisel shape. Indeed, I think the pupil should avail himself of every facility in the outset, and a little time is well bestowed in properly preparing the instrument with which he is to work; and although a master may express what he wishes with a bad instrument, I am sure he would do it better with a good one. Before making a line, its situation and extent should be well considered. It must be remembered, that when made, it is to stand as a portion of the object to be represented; and although we cannot expect to do always without erasure, we should not depend too much on the India rubber; and it is better to leave the false lines than to remove them, until the correct line is ascertained, as they serve to guard us from mistake in the same direction, and it also saves the surface of the paper from being destroyed by unnecessary erasure. The pencil should be held in that position which will allow of the greatest freedom in the movement of the hand, and at a right angle with the line to be produced. The line required for figure drawing is one of equal pressure, and even throughout; the pencil being held lightly in the hand. For landscape drawing, a varied pressure is required, sometimes light and sometimes accented, or abruptly terminating, giving that appearance of vigour and freedom which renders the sketch of a master in this method so effective, and which, being the result of long practice and perfect command of the instrument, is so difficult to imitate. In copying such a sketch, the pupil should rather attend to the character of the work than to making a servile copy of every chance line that may be found in it.

The lines used in shading with the lead pencil vary according to the form and texture of the object to be represented; rounded forms are best rendered by curved lines, while straight lines are used for flat surfaces, aiding by their direction the perspective changes of the form. The general shadows for trees or backgrounds should be commenced with regular lines passing from one side to the other and back again; bearing with rather more firmness, but still with regularity, on either the one or the other, so that the return-stroke shall be either lighter or darker, according to the order in which it is first commenced, graduating gently from the light, with a firmer pressure to the dark, leaving the extremities undefined, to be filled up in making the outline of the forms next to it; and it is better to leave them a little too open than too close, as it assists in giving the semi-transparent appearance and play of light observable in nature. The regularity of the lines, and their equality in tone, must be strictly attended to: one of the lines either darker or more unequal than another, disturbs the eye, and destroys the effect of continuity. It is by the rays proceeding from such lines crossing each other in their passage to the eye, (answering to the imperceptible motion of the atmosphere, the medium through which we view an object), that we succeed in giving to the mind the idea of shadows; and the irregularity to be avoided strikes the eye, when committed, as forcibly as a note out of tune does the ear, in the performance of a piece of music. The form of any object, with its light and shade, or the texture of the material, whether of draperies, of flesh, the human hair, the smooth and glossy, or the rough and shaggy skins of animals, the plumage of birds, or the characters of foliage, bark of trees, ground, and herbage, and stratification of rock, can all be satisfactorily represented by the lead pencil; but we must depend on colour for the ultimate results of artistic power; the pencil should be the means and not the end of our studies. Sir Joshua Reynolds, in his first discourse, says:—"A facility in composing, a lively, and what is called a masterly, handling of the chalk or pencil, are, it must be confessed, captivating qualities to young minds, and become of course the objects of their ambition. They endeavour to imitate these dazzling excellences, which they will find no great labour in attaining. After much time spent in these frivolous pursuits, the difficulty will be to retreat ; but it will be then too late; and there is scarce an instance of return to scrupulous labour-mastery. By this useless industry they are excluded from all power of advancing in real excellence. Whilst boys, they are arrived at their utmost perfection: they have taken the shadow for the substance; and make the mechanical facility the chief excellence of the art." So soon, therefore, as the pupil has gained sufficient command of the pencil to enable him to draw what is before him with confidence, he should proceed to the use of the brush and water-colours. This art has now reached such perfection in this country, that the utmost power the art of painting is capable of expressing may be arrived at through its means; the transparency, brilliancy, and power of the English school of water-colour painting, we may be justly proud of. The patronage it receives from the highest quarters, and the praise awarded to it by foreign schools of art, are now fast removing the last prejudice lingering against it,—its imagined want of durability;—any one taking the trouble to examine the old missals and illustrated manuscripts in the British Museum, will find that they have stood the test of ages with their brilliancy undiminished; and the material is so perfected by the improvements made in it by the colour-makers, that every facility is given to the school of water-colour painting, and all doubts of its durability removed to the satisfaction of every reasonable mind.

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